REMARKS

The claims have been amended to better define the scope of the invention.

Claims 1, 14 and 17 have been amended to define the claimed precursors as having appropriate characteristics for topical application for the delivery of pharmaceutical and/or cosmetic actives. Antecedent basis for these amendments may be found in paragraphs 30, 82 and 84 of the pending application. Claim 12 has been cancelled. In addition, claims 21-80 have been added to this application. No new matter is introduced as a result of these new claims. Antecedent basis for these new claims may be found in the following chart:

Claim Number	Antecedent Basis
21	Paragraphs 30, 46, 52, 54, 70, 82, 84
22	Paragraphs 47, 48
23	Paragraph 54
24	Paragraph 54, Table 6
25	Paragraph 54, Table 6
26	Paragraph 37
27	Paragraph 66
28	Paragraphs 30, 46, 52, 54, 70, 82, 84
29	Paragraphs 47, 48
30	Paragraphs 54, 55, 56, 57, 60
31	Paragraph 60, Table 6
32	Table 6
33	Paragraphs 58, 59, Table 6
34	Paragraphs 37, 63
35	Paragraph 66
36	Paragraphs 30, 46, 52, 54,

	70, 82, 84
37	Paragraphs 47, 48
38	Paragraph 54
39	Paragraph 54, Table 6
40	Paragraph 54, Table 6
41	Paragraph 37
42	Paragraph 66
43	Paragraphs 30, 46, 52, 54, 70, 82, 84
44	Paragraphs 47, 48
45	Paragraphs 54, 55, 56, 57, 60
46	Paragraph 60, Table 6
47	Table 6
48	Paragraphs 58, 59, Table 6
49	Paragraphs 37, 63
50	Paragraph 66
51	Paragraphs 30, 46, 52, 54, 70, 82, 84, Examples 1 and 2
52	Paragraphs 47, 48
53	Paragraph 54
54	Paragraph 54, Table 6
55	Paragraph 54, Table 6
56	Paragraph 37
57	Paragraph 66

58	Paragraphs 30, 46, 52, 54, 70, 82, 84
59	Paragraphs 47, 48
60	Paragraphs 54, 55, 56, 57, 60
61	Paragraph 60, Table 6
62	Table 6
63	Paragraphs 58, 59, Table 6
64	Paragraphs 37, 63
65	Paragraph 66
66	Paragraphs 30, 46, 49, 52, 54, 70, 82, 84,
67	Paragraphs 37, 63, 66
68	Paragraphs 30, 46, 49, 52, 54, 70, 82, 84,
69	Paragraphs 37, 63, 66
70	Paragraphs 30, 46, 49, 52, 54, 70, 82, 84,
71	Paragraphs 37, 63, 66
72	Paragraphs 30, 37, 46, 47, 48, 52, 54, 70, 82, 84,
73	Paragraph 54
74	Paragraph 54, Table 6
75	Paragraph 54, Table 6
76	Paragraphs 54, 55, 56, 57, 60
77	Paragraph 60, Table 6
78	Table 6
79	Paragraphs 58, 59, Table 6
80	Paragraph 66

Before considering the rejections in detail, the fundamental concepts of the present invention will be briefly reviewed. The present invention relates to a cubic liquid crystalline phase precursor comprising an amphiphile (A) capable of forming a cubic liquid crystalline phase, an optional solvent (B), and an additive (C) selected from the group consisting of an ionic anchor, a tether, and combinations thereof and wherein (A), (B), and (C) are present in mass fractions relative to each other such that $1.0 = a + b + c$, wherein a is the mass fraction of (A), b is the mass fraction of (B), and c is the mass fraction of (C). The precursor can optionally comprise a cosmetic or pharmaceutical ingredient. The claimed invention delivers these actives topically. The claimed compositions are not for ingestion.

The amphiphile can be a single amphiphile or a combination of two or more amphiphiles capable of forming a cubic liquid crystalline phase, preferably in the presence of a solvent and an additive. The solvent can be a single solvent or a combination of two or more polar or non-polar solvents and may contain other ingredients such as buffers and/or stabilizers. Generally the additive is an anchor, a tether and/or combination thereof, having a low Krafft temperature, preferably below about 25°C to prevent crystallization. It is preferred that the anchors be selected from positively and negatively charged surfactants. Tethers are preferably selected from derivatized polysaccharides and linear substituted polymers.

Objections to the IDS, Drawings and Specification

The Examiner noted that the publications of Hyde and McCutcheon were not received with the IDS and therefore were not considered. Since these references are lengthy texts, the Applicants have provided the Table of Contents for each of these

two references. If there is a particular chapter or pages that the Examiner would want for review, the Applicants will supply those pages at the Examiner's request.

The drawings were objected to for failing to comply with 37 CFR 1.84(p)(5) because they included reference to "114" in Figure 1 and "202" in Figure 2, while not mentioning those reference numbers in the description. As such, reference to "114" and "202" has been added to the description. Reference to these terms in the description does not constitute the introduction of new matter. The "114" refers to the multiple phase region of the ternary phase diagram as described in the specification on page 15, line 20. Reference to "114" was accidentally omitted from the text. However, it is apparent when reading this paragraph that all regions of the ternary phase diagram are numerically referenced with the exception of the multiple phase region (114).

The "202" refers to di(canola ethyl ester) dimethylamine chloride (DEEDAC), as described on page 17, line 25 of the specification. Reference to "202" was accidentally omitted from the text. It is evident when reading the text that "202", which bears a positive charge in Figure 2, refers to DEEDAC, which is the species carrying a positive charge as the amine salt described in the specification. Accordingly, no new matter is introduced as a result of this amendment.

The specification was objected to for several informalities. On page 4, line 28 of the specification, no reference was made to the lower range of "b", however there is a space where the reference should be. As such, the specification now reads "$1.0 > a > 0$, $1.0 > b > 0$, $1.0 > c > 0$ ..." Antecedent basis for this amendment may be found on page 16, line 2.

A second objection was that the specification did not define item "114" of Figure 1 and item "202" of Figure 2. These points have already been addressed above.

A third objection was that on page 7, line 27, the word "tethers" appears as a complete sentence. This term has since been deleted.

Finally, the Examiner asserts that on page 14, line 4, the Applicants may have intended to state that "The active *ingredient* can be..." rather than simply "The active can be..." However, in line 3 of that same paragraph, the Applicants state that the term "active" may be used as a shorthand term for "active ingredient." Thus, there are no amendments required to correct this portion of the specification.

Rejections Under 35 U.S.C. §112, second paragraph

Claims 1-13 have been rejected under 35 U.S.C. §112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which the Applicants regard as the invention.

In making this rejection, the Examiner asserts that claim 1 is incomplete for omitting essential elements, such as the omission for the claimed range of "b". Claim 1 has been amended to include the entire range of "b." Antecedent basis for this amendment can be found on page 16, line 2 of the specification. Thus, the Examiner's rejection of claim 1 under 35 U.S.C. §112, second paragraph, has been overcome and should be withdrawn.

Rejections Under 35 U.S.C. §102(e)

The Akashe et al. rejection (USP 6,274,574)

The Examiner has rejected claims 1-4, 11, 13-17 and 19-20 under 35 U.S.C. 102(e) as being anticipated by Akashe et al., (U.S. Patent No. 6,274,574). Akashe et al. teaches the use of mesophase-stabilized compositions for the delivery of cholesterol-reducing sterols and stanols in food products wherein the compositions contain plant sterols and/or plant esters and a mixture of two or three different emulsifiers. The Applicants respectfully traverse this rejection and urge the Examiner to consider the following matters that distinguish the Applicants' claimed invention over this cited reference.

Akashe et al. is directed to low-fat, fat-free and triglyceride-free food products which incorporate plant sterols, plant stanols, plant sterol esters, and plant stanol esters as cholesterol-reducing agents in low-fat, fat-free and triglyceride-free foods.

These cholesterol-reducing agents are incorporated into mouthfeel-enhancing, texture-building, emulsion-stabilizing and dispersion-stabilizing compositions which are mesophase-stabilized for use in low-fat, fat-free and triglyceride-free food products. This invention uses mesophase-stabilized compositions to incorporate plant sterols and/or plant sterol esters into a variety of food products. By incorporating the plant sterols and/or plant sterol esters into low-fat and fat-free food products by use of a mesophase, the cholesterol-reducing-compounds are effectively dispersed as individual molecules in the mesophase structure and thus reduce the tendency to crystallize.

Akashe et al. is silent as to the combination of amphiphile (a), an optional polar solvent (b), and ionic anchors/tethers (c) (as defined by the present application), for the formation of a cubic liquid crystalline precursor, bulk cubic gel or dispersion, and as represented by the following mass fractional relationships of components a, b and c:

$$1.0 > a > 0,\ 1.0 > b > 0,\ 1.0 > c > 0;$$

$$0.8 \geq a \geq 0.5,\ 0.8 \geq b \geq 0.5,\ 0.1 \geq c > 0;$$

$$0.15 \geq a \geq 0.05,\ 0.95 \geq b \geq 0.8,\ 0.05 \geq c \geq 0.01;\ \text{or}$$

$$1.0 > a > 0.7,\ 0.30 \geq b > 0,\ 0.1 > c > 0$$

Akashe et al. does not disclose such mass fractional relationships of components.

Further, the compositions of Akashe are directed to mesophase-stabilized compositions for use in low-fat, fat-free and triglyceride-free **food** products which incorporate plant sterols, plant stanols, plant sterol esters, and plant stanol esters as cholesterol-reducing agents. The basic thrust of Akashe et al. is to make the

compositions palatable for ingestion. The present composition discloses and claims cubic liquid crystalline phase materials for topical application to skin, hair, fabric, and plant surfaces, for the delivery of pharmaceutical and/or cosmetic active ingredients. None of the active agents claimed in the present invention include steroids or cholesterol-reducing actives. In fact, the present invention claims just the opposite of Akashe et al.'s sterols, i.e, "non-steroidal anti-inflammatory drugs." The compositions of Akashe are exclusively used in food products and not to be administered topically but rather orally. In contrast, compositions using the present invention are not for oral ingestion.

The tethers of the present invention comprise derivatized polysaccharides, linear substituted polymers, star polymers, polypeptides, and polynucleotides, and combinations thereof. Contrary to the Examiner's assertion, these substances are not emulsifiers/surfactants since they do not contain a hydrophilic head group and a hydrophobic end. Also, these substances do not function as emulsifiers/surfactants since these substances do not reduce interfacial tension.

Thus, since Akashe et al. does not teach or suggest every element of the present invention as claimed, the Examiner's rejection under 35 USC §102(e) should be withdrawn.

In addition, Akashe et al. cannot be the basis for an obviousness rejection since Akashe et al. does not provide any teaching or motivation for the design of a cubic liquid crystalline phase material for topical use.

The Anderson rejection (USP 6,482,517):

The Examiner has rejected claims 1-20 under 35 USC §102(e) as being anticipated by Anderson (USP 6,482,517). The Applicants respectfully traverse this

rejection and urge the Examiner to consider the following matters that distinguish the Applicants' claimed invention over this cited reference.

Anderson discloses a particle coated with a non-lamellar crystalline material that includes an internal matrix core having at least one nano-structured liquid phase (see FIG. 2 of Anderson). These particles are coated with an exterior of solid particles and are designed for the delivery and uptake of active agents.

The present invention is not directed to a coated particle but rather claims a cubic liquid crystalline phase gel precursor which comprises 3 components: an amphiphile, an optional solvent, and an additive, where the additive is selected from the group of consisting of anchors, tethers, and combinations thereof, the anchors being positively and negatively charged surfactants and tethers being polymers and biopolymers. These three components form a cubic liquid crystalline precursor as clearly defined in the claim, and not a coated particle. Further, Anderson does not disclose a 3 component system for the formation of either the internal core or the outer coating of the particle. The particle of Anderson is constructed such that the internal core comprises a matrix consisting essentially of a nanostructured material selected from the group consisting of: (i) at least one nanostructured liquid phase; (ii) at least one nanostructured liquid crystalline phase; (iii) or a combination of at least one nanostructured liquid phase; and at least one nanostructured liquid crystalline phase (col. 3, lines 27-37). Anderson does not disclose the use of an amphiphile, specifically monoglycerides in combination with an ionic anchor or tether (as defined by Lynch and Spicer) for the formation of coated particles. Thus, since Anderson does not teach or suggest every element of the present invention and the Examiner's rejection under 35 USC §102(e) should be withdrawn.

In addition, Anderson cannot be the basis for an obviousness rejection since Anderson does not provide any teaching or motivation for the design of a 3-component cubic liquid crystalline phase material with optional active ingredient.

The Engström et al. rejection (USP 5,371,109)

The Examiner has rejected claims 1-4, 7-8, 11-18 and 20 under 35 USC §102(e) as being anticipated by Engström et al. (USP 5,371,109). This patent relates to a controlled-release composition for a biologically active material, wherein the active material has been dissolved or dispersed in an L2-phase comprising: (a) at least one monoglyceride of an unsaturated fatty acid having 16-22 carbon atoms or a vegetable or animal oil containing such a monoglyceride; (b) at least one triglyceride of at least one unsaturated fatty acid having 16-22 carbon atoms or a vegetable or animal oil containing such triglycerides; and (c) at least one polar liquid selected from the group consisting of water, glycerol, ethylene glycol and propylene glycol to form a 3-component system (col. 2, lines 17-27; col. 2, lines 44-47).

The Engström et al. patent requires the use of a triglyceride in an L2 phase composition. The present application claims exclusively monoglycerides for the amphiphile. Monoglycerides are chemically distinct from triglycerides. The present invention does not claim or disclose the use of triglycerides for any of the three components of the cubic liquid crystalline phase precursor.

Thus, Engström does not teach every element of the present invention, the Examiner's rejection under 35 USC §102(e) has been overcome and should be withdrawn.

In addition, Engström et al. cannot be the basis for an obviousness rejection since Engström et al. does not provide any teaching or motivation for the design of a 3-component cubic liquid crystalline phase material with optional active ingredient.

In summary, the rejections under 35 U.S.C. §112, second paragraph, and 35 U.S.C. §102 have been overcome and should be withdrawn. Accordingly, the present application as amended herein, is now in form for allowance and early reconsideration and allowance of the claims, as currently pending, is earnestly solicited.

Respectfully submitted,

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